WHAT IS CLAIMED IS:

1.   An object interaction expression apparatus for expressing interactions between plural objects that move by simulation in a virtual space, comprising:

5   an expression mode storing unit that stores in a correlated form an interaction magnitude of an object and a corresponding expression mode in which the interaction magnitude will be expressed;

an interaction magnitude calculating unit that calculates interaction magnitudes of objects that interact with each other; and

10   an expression controller that controls an expression of the interaction magnitude of the objects that interact with each other based on the expression mode stored corresponding to the interaction magnitude calculated.

15 2.   The object interaction expression apparatus according to claim 1, wherein the interaction magnitude calculating unit calculates the interaction magnitude from a distance between the objects.

3.   The object interaction expression apparatus according to claim 2, 20 wherein the interaction between the objects is collision, and the interaction magnitude calculating unit calculates the interaction magnitude from the distance between the objects after an elastic deformation of the objects.

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4.   The object interaction expression apparatus according to claim 2, wherein the interaction between the objects is collision, and the interaction magnitude calculating unit calculates the interaction magnitude from the distance between the objects after a plastic

5   deformation of the objects.

5.   The object interaction expression apparatus according to claim 1, wherein the interaction between the objects is collision, and the interaction magnitude calculating unit calculates the interaction

10   magnitude in terms of a denting amount.

6.   The object interaction expression apparatus according to claim 1, wherein the expression mode storing unit stores as correlated expression modes visual mode, and one or both of aural and tactile

15   expression modes.

7.   The object interaction expression apparatus according to claim 4, wherein the interaction between the objects is collision, and the expression mode storing unit stores pre-collision and post-collision

20   interaction magnitudes by correlating the interaction magnitudes with the expression mode expressed by changing colors, and the interaction magnitudes during collision by correlating the interaction magnitudes with the expression modes expressed by one or more of impact waveform, impact wave animation, color, impact sound, and vibrations.

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8.   The object interaction expression apparatus according to claim 1, wherein the objects are constituent elements of a product, and the expression modes that express the interaction magnitude constitute modes comprehensible by a designer of the product.

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9.   A method for expressing interactions between plural objects that move by simulation in a virtual space, comprising the steps of:

storing in a correlated form an interaction magnitude of an object and a corresponding expression mode in which the interaction

10   magnitude will be expressed;

calculating interaction magnitudes of objects that interact with each other; and

controlling an expression of the interaction magnitude of the objects that interact with each other based on the expression mode

15   stored corresponding to the interaction magnitude calculated.

10.   The method according to claim 9, wherein the calculating includes calculating the interaction magnitude from a distance between the objects.

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11.   The method according to claim 10, wherein the interaction between the objects is collision, and the calculating includes calculating the interaction magnitude from the distance between the objects after an elastic deformation of the objects.

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12. The method according to claim 9, wherein the storing includes storing as correlated expression modes visual mode, and one or both of aural and tactile expression modes.

5   13. The method according to claim 12, wherein the interaction between the objects is collision, and the storing includes storing pre-collision and post-collision interaction magnitudes by correlating the interaction magnitudes with the expression mode expressed by changing colors, and the interaction magnitudes during collision by

10   correlating the interaction magnitudes with the expression modes expressed by one or more of impact waveform, impact wave animation, color, impact sound, and vibrations.

14. A computer program that makes a computer execute:

15   storing in a correlated form an interaction magnitude of an object and a corresponding expression mode in which the interaction magnitude will be expressed;

calculating interaction magnitudes of objects that interact with each other; and

20   controlling an expression of the interaction magnitude of the objects that interact with each other based on the expression mode stored corresponding to the interaction magnitude calculated.

15. The computer program according to claim 14, wherein the calculating includes calculating the interaction magnitude from a distance between the objects.

5 16. The computer program according to claim 15, wherein the interaction between the objects is collision, and the calculating includes calculating the interaction magnitude from the distance between the objects after an elastic deformation of the objects.

10 17. The computer program according to claim 14, wherein the storing includes storing as correlated expression modes visual mode, and one or both of aural and tactile expression modes.

18. The computer program according to claim 17, wherein the
15 interaction between the objects is collision, and the storing includes storing pre-collision and post-collision interaction magnitudes by correlating the interaction magnitudes with the expression mode expressed by changing colors, and the interaction magnitudes during collision by correlating the interaction magnitudes with the expression
20 modes expressed by one or more of impact waveform, impact wave animation, color, impact sound, and vibrations.